SPECIFICATION

To All Whom It May Concern:

Be It Known That I, Benjamin J. Holtz, a citizen of the United States, resident of the City of St. Louis, State of Missouri, whose full post office address is 6640 Winnebago St. Louis, MO 63109, have invented certain new and useful improvements in

NAIL POLISH REMOVER

CROSS REFERENCE TO RELATED APPLICATIONS

BACKGROUND OF THE INVENTION

The present invention relates to a nail polish remover with excellent solvency and reduced environmental impact. The remover of this invention is especially useful with artificial nails. Specifically, the nail polish remover contains methyl acetate, water, and a stabilizer. Further, the nail polish remover meets or exceeds contemporary regulations regarding air quality, while providing the same functional characteristics as products currently available.

Many compositions are known to be useful in removing nail polish. These compositions depend primarily on the activity of an organic solvent to soften or dissolve the nail polish. Subsequently, the polish is removed with a gentle rubbing motion. However, many of the existing compositions have shortcomings that preclude their use.

Growing concern about air quality has been driving national, state and local regulatory initiatives to improve air quality. Many of the products currently available will not be acceptable in the new regulatory environment. Ethyl acetate and ethanol have been employed as nail polish removing solvents for a long time and are currently used for artificial nail polish removal. Faryniarz describes an optimized system using ethyl acetate in U.S. Patent No. 5,486,305. The combination is quite well suited to removing nail polish from artificial nails and has a history of safe use. However, both ethyl acetate and ethanol contribute to smog production and will no longer be environmentally acceptable in the State of California.

Nail polish removers currently available that exhibit acceptable environmental impact typically lack the aggressive solvency that consumers expect.

A thickened gamma butyrolactone (GBL) nail polish remover is described by Perlman in Patent No. 6,521,572. GBL was the subject of an FDA Talk Paper in 1999 for its toxic effects. The potential for harm to consumers in the course of removing nail polish is too great to consider this material a viable option.

In U.S. Patent No. 6,071,865, Pickering teaches a nail polish remover comprised of N-methylpyrrolidone (NMP) and fatty acid methyl or ethyl esters. Although the author claims low toxicity, NMP was listed under California Proposition 65 as a reproductive toxin in 2001.

A number of solvents have proven to have a limited impact on smog and have been exempted from governmental regulation. Acetone is the most notable exempted chemical for effective nail polish removal. Unfortunately, acetone is destructive to structured or artificial nail products. A number of other types of chemicals are also exempted, but tend to be too costly to be practical.

In U.S. Patent No. 6,379,656, Mui describes a multi-phase nail polish remover with methyl acetate. A single phase system is not mentioned, nor is the system designed for low environmental impact.

In U.S. Patent No. 5,866,104, Cataneo describes a nail polish remover with low volatility comprising glycol ethers and glycol ether esters. The more effective blends identified in the description do not currently meet regulatory requirements for VOC content, due to unacceptable vapor pressures and boiling points. The less effective blends do not offer the solvency required for an adequate nail polish remover.

The object of the current invention is to provide a safe, effective, and environmentally acceptable nail polish remover for artificial nails.

SUMMARY OF THE INVENTION

The invention comprises a single phase aqueous methyl acetate nail polish remover composition, which is environmentally acceptable and compatible with artificial nails.

DETAILED DESCRIPTION OF THE INVENTION

The following detailed description illustrates the invention by way of example and not by way of limitation. This description will clearly enable one skilled in the art to make and use the invention, and describes several embodiments, adaptations, variations, alternatives and uses of the invention, including what I presently believe is the best mode of carrying out the invention. As various changes could be made in the above constructions without departing from the scope of the invention, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

The following examples are given to illustrate the composition of the present invention, but are not to be construed as limiting:

Example No. 1		
Ingredients	Amount w/w%	Charactoristics
Methyl Acetate (High Purity - Eastman Kodak)	40	The nail polish remover was clear. The composition was tested with a consumer panel for efficacy as compared to current commercial products. Stability testing was executed and found that the hydrolytic stability of the composition was adequate.
Diethylene glycol monobutyl ether (Butyl Carbitol - Dow Chemical)	16	
Dimethyl Esters (DBE-3, DuPont) Vapor Pressure <0.1mm Hg at 20°C	5	
Sodium Acetate	0.05	
Purified Water	38.75	
Fragrence	0.2	

Example No. 2		
Ingredients	Amount w/w%	Charactoristics
Methyl Acetate (High Purity - Eastman Kodak)	30	The nail polish remover was slightly hazy. The composition was tested with a consumer panel for efficacy as compared to current commercial products. Stability testing was executed and found that the hydrolytic stability of the composition was adequate.
Diethylene glycol monobutyl ether (Butyl Carbitol - Dow Chemical)	15	
Dimethyl Esters (DBE-3, DuPont) Vapor Pressure <0.1mm Hg at 20°C	5	
Sodium Acetate	0.1	
Purified Water	49.7	
Fragrence	0.2	

Example No. 3		
Ingredients	Amount w/w%	Charactoristics
Methyl Acetate (High Purity - Celanese)	25	The nail polish remover was clear. The composition was tested for solvency as compared to current commercial products. The nail polish remover was marginally successful.
Diethylene glycol monobutyl ether (Butyl Carbitol - Dow Chemical)	8.8	
Dimethyl Esters (DBE-3, DuPont) Vapor Pressure <0.1mm Hg at 20°C	0.1	
Sodium Acetate	0.1	
Purified Water	65.8	
Fragrence	0.2	

Example No. 4		
Ingredients	Amount w/w%	Charactoristics
Methyl Acetate (High Purity - Celanese)	20	The remover was clear. When tested agains commercial products, the remover exhibits adequate solvency, but evaporates more slowly than commercial porducts.
Diethylene glycol monobutyl ether (Butyl Carbitol - Dow Chemical)	59.9	
Dimethyl Esters (DBE-3, DuPont) Vapor Pressure <0.1mm Hg at 20°C	10	
Sodium Acetate	0.1	
Purified Water	9.8	
Fragrence	0.2	

Example No. 5		
Ingredients	Amount w/w%	Charactoristics
Methyl Acetate (High Purity - Eastman Kodak)	30.51	The remover was slightly hazy. The solvency was comparable to commercial products. The hydrolytic stability is comparable to the sodium acetate compositions.
Diethylene glycol monobutyl ether (Butyl Carbicol - Celanese)	14.76	
Dimethyl Esters (DBE-3, DuPont) Vapor Pressure <0.1mm Hg at 20°C	4.92	
Purified Water	49.5	
Fragrence	0.2	
Monobasic Portasium Phosphate	0.04	
Sodium Hydroxide to pH 7	0.01	

Example No. 6		
Ingredients	Amount w/w%	Charactoristics
Methyl Acetate (High Purity - Celanese)	30	The remover was clear. When tested for solvency against commercial products, it was comparable. When tested on artificial nails and nail glue, the nail glue was not affected, but the artificial nail softened unacceptably.
Acetone	20	
Diethylene glycal monobutyl ether (Butyl Carbitol - Dow Chemical)	15	
Dimethyl Esters (DBE-3, DuPont) Vapor Pressure <0.1mm Hg at 20°C	5	
Fragrence	0.2	
Sodium Acetate	0.1	
Purified Water	29.7	

The present invention uses an aqueous single phase methyl acetate solvent composition. The principal active ingredient is methyl acetate. The methyl acetate can be from about 20 to about 80% of the composition and preferably is about 30 to about 50%.

Optionally, a dimethyl ester with a vapor pressure less that 0.1mm Hg at 20°C can be used to increase the activity of the methyl acetate. The dimethyl ester is present in an amount of about 0.1 to about 10% and preferably from 3 to about 5%. The preferred dimethyl ester is a commercial product, DuPont DBE-3, which is a blend of dimethyl adipate and dimethyl glutarate and has a vapor pressure of less than 0.1 mm Hg at 20°C.

The methyl acetate has a solubility in water of 22%. To increase solubility and make a haze free single phase system, a glycol ether coupling agent is used in the amount of about 5% to about 75% and preferable from about 10% to about 20%. The glycol ether has a vapor pressure of less than 0.1mm Hg at 20°C.

A buffering agent is included to reduce the rate of ester hydrolysis. The optimum pH is 5.0 to 9.0 with pH of about 7.0 as the preferred value. Sodium acetate is the preferred buffering agent in an amount of about 0.1% to about 10%; another possible buffer system is phosphate based.

Fragrance, dye, conditioning agents, emollients, and humectants can be included in the composition as desired, from 0 to 10% Suitable humectants include glycerine, propylene glycol, fatty acid esters and mixtures thereof. Humectants can be included in the composition as desired.

Purified water in an amount of about 10 to about 70% is used to bring the composition to 100%. Preferably about 30 to about 50% purified water is used.

Acetone can be combined in an amount of about 0.1 to about 20%, preferably about 5%. However, acetone is destructive to structured nail products.

In view of the above, it will be seen that the several objects and advantages of the present invention have been achieved and other advantageous results have been obtained.

It is to be understood that the present invention is not limited to the exact description or examples given, and that various modifications and equivalents will be apparent to those skilled in the art.